

## THE GOYT'S MOSS COLLIERY, BUXTON

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### SUMMARY

The Goyt's Moss Colliery, the history of which is well documented, is of national importance because of the exceptional preservation of its surface remains which have survived because they lie mostly on high moorland. There are over 200 pits and shafts, with associated access causeways and a drainage sough, sunk from the 17th or early 18th to the late 19th centuries primarily to provide coal for limeburning. Our knowledge of the surface remains has been advanced recently by an archaeological assessment, which allows the chronology of the colliery to be understood in some detail. Mining migrated across Goyt's Moss, exploiting the outcropping seam first, then deeper reserves were worked with increasing use of more sophisticated mining techniques. At any one time only a handful of shafts at most were in use. Newly analysed historical sources allow re-assessment of aspects of the colliery, including a re-appraisal of the late 18th and 19th century major underground access levels from Burbage. We now know there were three of these, not two as previously thought.

### INTRODUCTION

Goyt's Moss is located to the west of Buxton within the Goyt syncline. The small coalfield is a detached part of the larger Cheshire field and contains two seams from the lower coal measures. The Ringinglow seam is the lower of the two and is recorded as approximately 1.2m thick at 133m depth. The Yard coal is the upper seam and is 1.4m thick at 30m depth. Depth of seam varies due to their position in the syncline; to the east the lower seam is documented as on a gradient of one in four, while at the centre of Goyt's Moss the upper seam is virtually horizontal. Locally the seams were termed 'House' and 'Goyt' coals respectively. Of the two, the former was the better coal but neither had a high calorific value. The Yard coal was used predominantly for lime burning and had a high ash content. The surface remains described in detail in this paper exploited the Yard coal. There is also a discussion of documented 18th and 19th century access levels that were working both seams.

The Goyt's Moss Colliery has surface remains which are of national importance both because of their extent and range, being a relatively undisturbed example of a coal mine which dates from the 17th or early 18th to the late 19th centuries.

Mining is first recorded on neighbouring Axe Edge in 1662 but not specifically on Goyt's Moss until 1751, although some of the workings here are likely to date from the 17th or early 18th centuries. In the adjoining areas of Macclesfield Forest and Quarnford the earliest records of mining are in 1382 and 1401 respectively. Exploitation of the Yard and Ringinglow seams under Goyt's Moss and Axe Edge respectively has been by outcrop working, shallow shafts

some of which were accompanied by horse gins, deep shafts with steam engines, and by major underground canal and haulage levels. Production reached a high at the end of the 18th century when the Grin lime kilns, located 1-2km to the east, were at their most active. Thereafter, production fell as Grin went into a 50 year decline (Leach 1996). After a further productive period in the second half of the 19th century, the advent of the railways enabled the importation of better quality coal so, when the mines needed massive new investment for further drainage, the decision was made to close them. The Goyt's Moss Colliery, which was largely worked out, closed in 1893. The Burbage Colliery on Axe Edge closed in 1919.

In the ten years since *'The Coal Mines of Buxton'* was published by Alan Roberts and John Leach (1985) our understanding of the Goyt's Moss Colliery has been advanced, both by an archaeological survey of the surface features (by JB) and by the analysis of further documentary sources (by JL).

The archaeological survey was undertaken as part of a larger assessment of the whole of the upper Goyt valley watershed, identifying features of all periods and types (Barnatt 1994). While the extensive Goyt's Moss Colliery was surveyed, the equally important coal mines on Axe Edge, running south to the county boundary with Staffordshire and continuing into the upper Dane valley, have not received the same treatment. The Ringinglow seam outcrops to the east and west of Goyt's Moss but has only been extensively mined on the eastern side. Here it runs south from Burbage Edge, where it was worked in Derbyshire by the Bucket Engine and other shafts, to the Thatch Marsh and Burbage Collieries on Axe Edge and then on to a mine at Black Clough (Fig. 1). The seam was also mined to the south on Orchard Common in Staffordshire and on the western side at Dane Bower in Cheshire. Mine workings at Goyt's Moss, Axe Edge and at Black Clough were all owned, together with the mineral rights, by the Dukes of Devonshire and managed as one unit. This was not fully appreciated in earlier publications and so the economic understanding of the operations has become disjointed. Goyt's Moss and Axe Edge are described by Roberts and Leach (1985) and Leach (1986; 1987) and Black Clough is described by Leach separately (1996; in press a). However, this paper will concentrate on Goyt's Moss, excepting the discussion of 18th and 19th century levels. Most of the surface features here relate to earlier episodes of mining, before the two areas were joined by an underground adit in the mid-19th century.

The detailed sketch plan of the surface features was compiled from vertical aerial photographs, in combination with field inspection of all features. The survey archive is held in the Peak Park Joint Planning Board archaeological archive in their Bakewell office and can be inspected upon request. Much of the colliery lies on open moorland, with the exception of an area to the north-west which lies within fields probably laid out in the early 19th century. Most of the land has no public access and should only be visited with permission of the owners. Great care should be taken as the shafts are inherently dangerous being prone to collapse.

The opportunity is also taken here to revise and expand upon aspects of interpretation derived from documentary sources. Of particular importance is a re-assessment of the development of the colliery as a whole via long underground levels from Burbage, one of which was driven to Goyt's Moss. The picture presented previously (Roberts and Leach 1985, 42-43, 57-58) can now be seen to have been over-simplistic, there having been three main levels not two.

This paper will not attempt a comprehensive historical account of the coal mines on Goyt's Moss, much of which has been published previously, but will concentrate on those aspects that are new.

## THE GOYT'S MOSS COLLIERY — THE SURFACE REMAINS

This colliery covers an extensive area of the Goyt's Moss basin at the head of the River Goyt (Fig. 1). It exploited the Yard seam, which due to its presence within the Goyt syncline, outcrops at the edge of a large oval area about 1.0x1.5km across, centred on Derbyshire Bridge

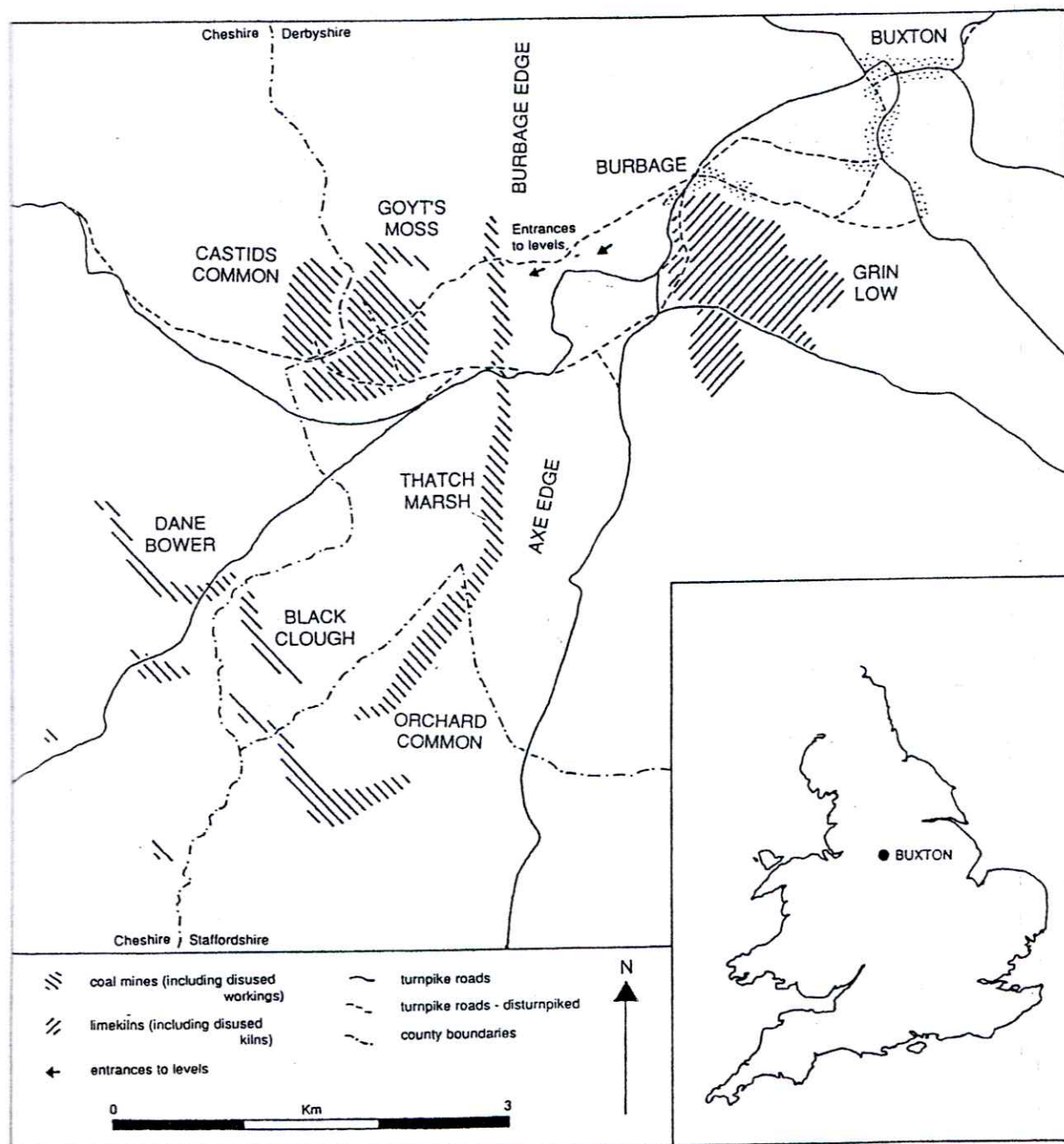


Fig. 1 The Goyt's Moss Colliery: The Goyt's Moss/Axe Edge area in the mid-19th century.

(SK 017718). At the heart of this area, virtually all of which has had its coal extracted over the centuries, this seam is about 15-30m below the surface. Between the heart and the outcrop at the edge it is up to double the depth due to the ground surface rising steeply to the ridgetops which surround the basin. The seam was 1.4m thick but the coal was sulphurous and thus most suitable for industrial rather than domestic purposes. The majority of the output was used at

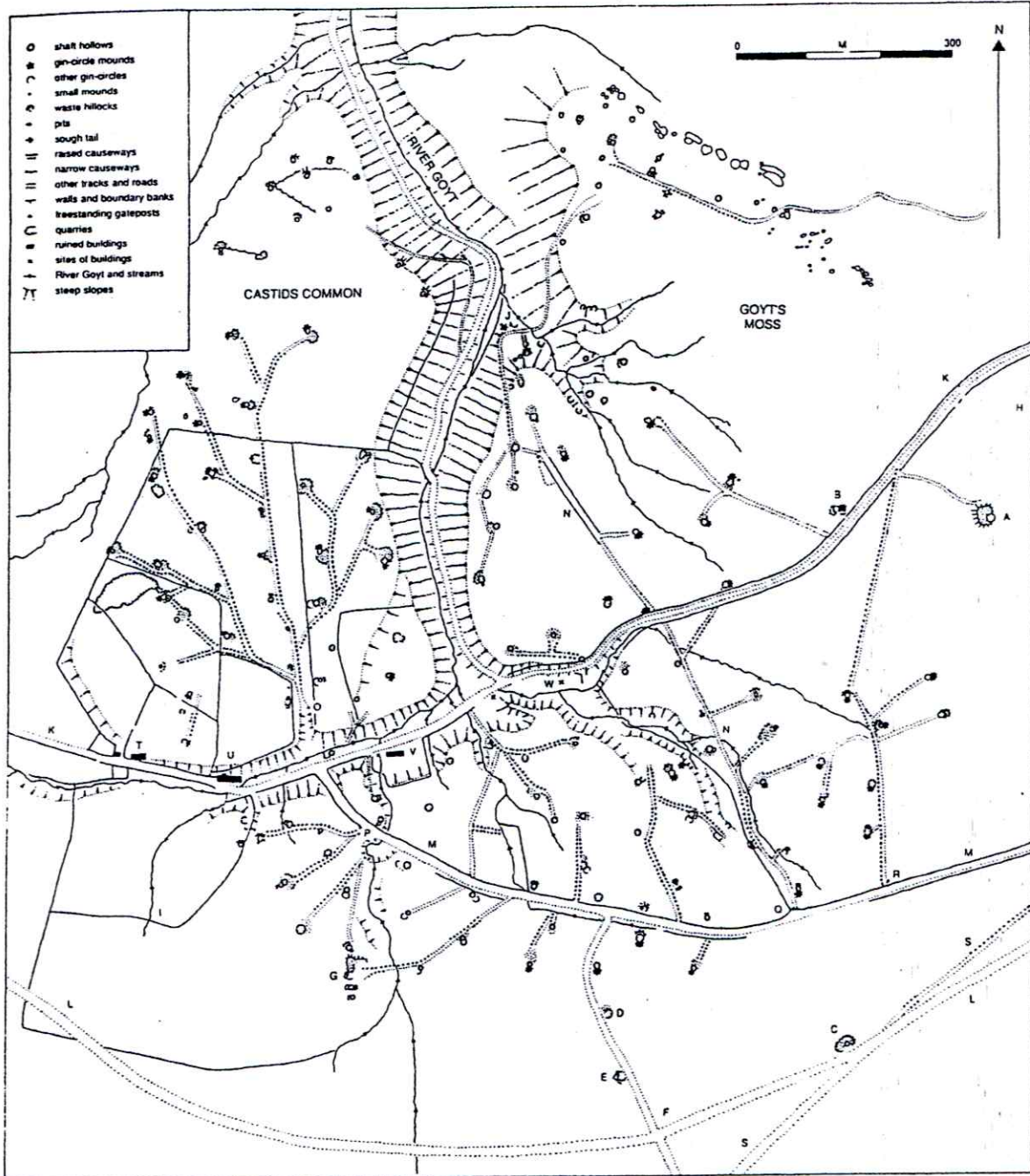


Fig. 2 The Goyt's Moss Colliery: surface features.

the limekilns at Grin Low just south of Buxton and for limeburning on local farms (Roberts and Leach 1985, 21-24, 48-55; Roberts 1992, 43-44; Leach 1996, 101-32).

The surface remains of the colliery are extensive and varied (Fig. 2), including over 50 opencast pits and 163-72 shafts of various types, nine of which cannot be certainly identified from their surface remains. Many have adjacent gin engine mounds and the majority have access causeways. There is also a drainage sough tail and associated turnpike roads, some of which were built especially to access the coal mines. The inter-relationship of dated roads to shaft causeways, the dendritic nature of the way causeways developed, and the different types of shaft present, allows the development of the colliery to be reconstructed.

Surrounding the majority of the shafts, which date from the 18th and first half of the 19th centuries, are a scattering of others that were used for ventilation, pumping and drawing from the later 19th century mine which worked the then remaining reserves. These reserves were removed using pillar and stall working, with the main access via a long adit driven from Burbage (anon. 1902, mine abandonment plans 1894, 1919).

The general history of the colliery is relatively well documented (Roberts and Leach 1985; Leach 1986; 1987) and two colliery plans (Staley 1818; anon. 1902) and the two mine abandonment plans (No. 3072 for 1894; No. 6915 for 1919) have also been consulted to compile the account given here. This description will concentrate on the visible archaeology, with only a brief restatement of the history to place features in their context.

Surface working probably started in the 17th or early 18th century. Shaft sinking began in the first half of the 18th century. Access to the coal pits was initially by packhorses using hollow-ways, but transportation was radically improved with the building of the Buxton to Macclesfield Turnpike in 1759. This made larger scale extraction more practical and production was increased, particularly from the 1780s onwards, and a peak in profits was reached between 1790 and 1816 (Chatsworth archives). In order to capture a part of these profits, the Buxton to Leek Turnpike Trust built branch roads to the colliery in 1773. From this date onwards the two trusts competed for the trade (Roberts 1992, 43-80). Mining by sinking relatively closely-spaced shafts was the norm until the mid 19th century. By this date all the coal close enough to the surface to be economically extracted by this method had been removed. Two areas of reserve still remained, to the east and south, both predominantly at greater depth because of ridgetops above. To extract this coal a level was extended from workings in the Ringinglow seam under Burbage Edge, and air and pumping shafts were sunk (Roberts and Leach 1985, 58, 63; anon. 1902). The level reached the eastern area of the Goyt's Moss reserves in the early 1860s. Working continued here until 1880. At the same time the level was gradually extended, reaching the southern reserves in 1868. These were exhausted by 1893. The coal supporting the main drive ways through both areas was removed in 1893-94, presumably collapsing these levels in the process.

Although all the 18th and early 19th century shafts depicted on Figures 2-4 superficially appear to be integral parts of Goyt's Moss Colliery, this is not the case for one area. Castids Common, the land west of the River Goyt and north of the 1759 turnpike road, lay within Cheshire rather than Derbyshire until boundary re-organisation in the 20th century. Before 1780 the Cheshire and Derbyshire parts of the coal reserves were mined as two separate enterprises. The Cheshire Mines were owned in the mid-18th century by the Dickinson's, lords of the manor of Taxal (Leach 1992, 15-17). However, from 1780 mining in the two areas was controlled by the Duke of Devonshire, who owned the Derbyshire land and rented that in Cheshire. From this date both areas supplied the Duke's kilns at Grin Low. From the 1730s to

at least the 1760s the Dickinson's had their own kilns at Grin Low, working in competition with the Duke's (Leach 1996, 105-106). In order to maximise profits while the mines were at their peak, the Duke managed them directly through his estate from 1790 to 1825, rather than renting-out the mining rights (Chatsworth archives; Leach 1996, 113).

The different types of opencast pits and shafts employed over time are a direct reflection of the depth of the coal seam below the surface. The earliest features are the opencast pits to the north-east. These have been dug close together, and are irregular in shape and depth. They only occur at the north-eastern part of the coal outcrop, indicating this is where the coal was first discovered. In contrast, where the coal outcrops elsewhere round the fringes of the Goyt basin there are no workings, indicating that the position of outcropping coal was not known about until discovered in the 19th century by following the seam up from depth. Pits to the east, previously suggested to be opencast pits (Roberts and Leach 1985, 16, 30), upon re-inspection are more probably wall builders quarries.

Close-spaced 18th and early 19th century shafts cover much of the visible colliery. There are at least 155 of these, and they are of two or possibly three different types. All had one thing in common, they needed to be close together to overcome ventilation problems. Their close spacing also avoided the necessity of transporting coal a long distance underground. A proliferation of shafts was only cost effective when each was relatively shallow. The earliest and shallowest shafts are recognised as simple hollows with no or only small spoil heaps. These would have had coal extracted by hand winches known regionally as stowes. At two to three examples at the north-eastern end of the colliery, the shaft hollows each have two small mounds placed at opposite sides of the shaft. The presence and character of these mounds may indicate that these shafts had large frames erected to support hand-wound head-gear. If shafts more generally within the colliery were similar to lead mines in the region, the stowes were normally quite smaller and we would not expect to see visible evidence today to confirm their presence.

As shafts became deeper, hand winches would have become impractical. For deeper shafts horse-drawn gin winding-engines were used. These could have been of two basic types. The first to be developed nationally rather than regionally was the cog and rung gin, where the horse went round the shaft which had winding gear above. The later and more easily used whim gin had the horse circling the winding gear to one side of the shaft. By the early 18th century gin engines are well documented in Peak District lead mines (Ford and Rieuwerts 1983). The earliest documentation in the region is of the whim type, but cog and rung gins may well also have been in use (Jim Rieuwerts *pers. comm.*). The introduction of gins of any sort at Goyt's Moss may not have taken place until the mid or late 18th century, as shafts had not become deep enough until this time.

Recognition of shafts which had whim gins is often relatively easy, but not so in every case. These engines were normally placed on the upslope side of the shaft, to increase clearance. In many cases the gin was placed on a flat-topped, circular mound which increases clearance further and also helped prevent water entering the shaft. An examination of the distribution of different types of whim gin features across Goyt's Moss (Fig. 3) suggests that the trend to place the gins on a mound increased through time. Whim gins set on the ground surface or in slight hollows occur to the south and south-west, in an area likely to have been mined in the mid to late 18th century. In contrast, whim gins on high mounds are found to the east and north-west in areas mined at a late 18th century, or more probably, early 19th century date.

Identifying cog and rung gins is problematic. In theory they should be visible as relatively large-diameter, flat-topped, platforms or hollows surrounding shafts. Features matching this

description do exist (Fig. 3). However, all these are open to alternative explanation as the product of the collapse of shafts and the subsequent silting of the resultant hollow.

As shafts fell out of use it was normal practice to seal them. To save time and materials, this is thought to have been done usually by blocking them a short distance below the top with timbers and then backfilling above this. In the western part of the Goyt's Moss Colliery small

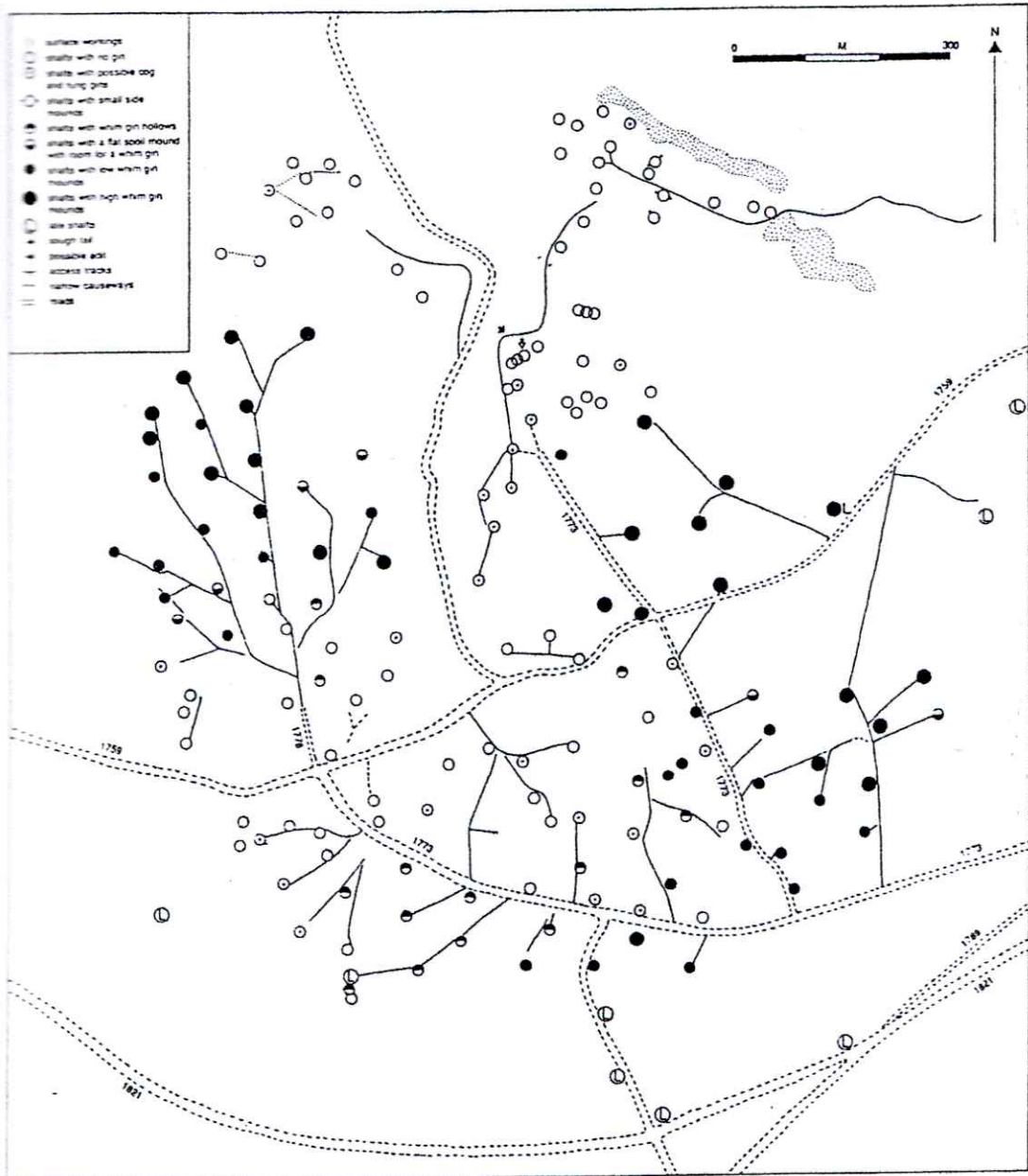


Fig. 3 The Goyt's Moss Colliery: analysis of shaft types.

quarry pits used for this purpose are common, cut adjacent to the sides of shafts (Fig. 3). Elsewhere, it may well be that shaft backfilling was achieved by removing part of the gin mound, or by collapsing the ginging, the drystone walling lining the shaft top. This would leave a relatively small hollow at the shaft top from the outset. There are such features surviving today. In many other cases evidence for the method of backfilling has gone, due to subsequent extensive collapse of the ground surrounding the shaft top.

Many shafts have suffered major collapse as the blocking has given way and material has dropped down the shaft, which, with subsequent erosion, leaves a hollow 5-10m across. These now often hold standing water. At the other extreme, a few shafts have clearly had no collapse whatsoever. Many more have relatively small hollows, suggesting that although collapse has taken place, much of the shaft still remains unfilled and is prone to further collapse. That the shafts are indeed dangerous is demonstrated by a shaft in the south-eastern part of the colliery which opened up relatively recently and is currently fenced off. At this shaft the lower part of the drystone ginging has been revealed.

The range of collapse into shafts is well demonstrated at those with gin mounds. The gin mounds, all of which would have been circular originally, now range from near intact features, to others where only a crescentic mound survives at the point furthest from the shaft. On flat, poorly drained land many of the shaft hollows are shallow but relatively large. These are the ones that may have contained cog and rung gins. However, the most likely explanation for them seems to be that they are collapsed shafts that have silted with soil and/or filled with peat. This interpretation is indicated by the existence of several identical shaft hollows which have an adjacent gin mound; these clearly never had cog and rung gins.

The majority of shafts are associated with access tracks, often traceable as raised causeways. In other instances they are visible today as little more than linear vegetation changes. The tracks are usually of cart width. However, there is a small discrete concentration of narrow banks to the north-west which may have been designed to be used by wheelbarrows or pack-horses. One of the most noticeable characteristics of the causeways is that they frequently change direction at shafts. This is particularly evident on Castids Common. The angle changes indicate that causeways were extended gradually from shaft to shaft, with new stretches added as further shafts were sunk. That causeway construction was a continually ongoing process is confirmed by the colliery account books which commonly include payments for this (Roberts and Leach 1985, 37-40). That the majority of shafts have relatively little spoil associated with them suggests the material was used in causeway construction. Some shafts, particularly where causeways only needed to be short, do have spoil heaps as well as causeways and gin mounds. Where spoil heaps occur they are normally low and placed on the downslope side opposite the gin mound. Causeways run to them and they would have been used as working areas for transferring coal from the shaft to carts. They would have been particularly useful in areas of wet ground.

After the level was extended from Burbage Edge in the mid-19th century a number of shafts remained in use and new ones were sunk, all of which are shown on later colliery plans (anon. 1902; abandonment plans 1894; 1919). Today these have remains which include to the east a large irregular spoil heap, with backfilled shaft (Fig. 2, A). This was the main shaft on the level in this part of the colliery and was 148 feet (45m) deep. It may well have been sunk for ventilation when the level was driven in the late 1850s or more probably the early 1860s. Nearby is what was one of the last gin engine shafts sunk at the colliery (Fig. 2, B). This was sunk in the 1840s-1850s and continued in use through the later 19th century, probably retained for ventilation. Another blocked shaft with irregular spoil heap lies to the south (Fig. 2, C).



This was the main access shaft to a small area of pillar and stall working mined in the late 1850s and early 1860s, which was later subsumed by more extensive workings active between 1868 and 1893, worked from the main adit once it reached this area. Three shafts a little to the west, within another small mid-19th century pillar and stall working were also retained once the level reached here, again presumably used for ventilation (Fig. 2, D-F). The southernmost has few traces at the surface. A blocked shaft to the west, with irregular spoil heap (Fig. 2, G), was a 30 yards (27.5m) deep pumping shaft which was probably sunk in the late 1860s. Pillar and stall working nearby started in the early 1870s. The colliery plans shows two further late 19th century shafts, used for ventilation, that have left few traces at the surface (Fig. 2, H, I).

East of the River Goyt, at the base of the steep valley side c. 250m north of Derbyshire Bridge, is the gated entrance to a drainage sough (Fig. 2, J). It measures 1.5m across, is 1.0m high and still issues water. Little is known of the history of this level. A letter dated 1776 (Chatsworth archives) notes there were two levels being driven at this time at the colliery as a whole (see below). One was the second tunnel driven from Burbage to the Axe Edge mines, the sough to the Goyt is perhaps the other. If so, it was dewatering a small area of mining to the south (see Table 1 — area G). Other possibilities are that it is earlier, driven in conjunction with mines immediately above, worked earlier in the 18th century (see Table 1 — area C), or that it was driven to mines further to the south-east, worked in the first half of the 19th century (see Table 1 — area L).

A number of turnpike roads are associated with the colliery (Roberts 1992, 43-80). The earliest was built by the Buxton to Macclesfield Turnpike Trust under an Act (32 GII C41) dated 1759 (Fig. 2, K) and was in use until replaced by a new road with gentler gradients built further south, under a later Act (1+2 Geo IV c36) dated 1821 (Fig. 2, L). When first built the 1759 road was not walled out. This did not take place until either 1780, during disagreement with the Buxton to Leek Turnpike Trust (Roberts 1992, 62), or more probably 1804, as the Hartington Enclosure Award plan shows the walls as newly-planned, forming part of proposed enclosed land parcels (anon. 1804).

The other main turnpike trust building roads in the area, the Buxton to Leek Turnpike Trust, built two branches to the colliery, under an Act (13 GIII c106) dated 1773, in order to benefit from the lucrative colliery trade (Fig. 2, M, N). Part of the western branch is still in use, while further east it fell out of use after 1821. The northern part of the other branch was short-lived, being little used after mines here fell out of use by 1780, although it was again providing access to shafts in the 1840s (Ordnance Survey 1842). The western branch was extended slightly in 1778 (Fig. 2, O), to provide easier access to the shafts on Castids Common. It had been abandoned by 1842, as it is not shown on the Ordnance Survey map of this date. None of these branches were initially walled but had freestanding gateposts at the entrances to colliery causeways, three sets of which still have surviving posts (Fig. 2, P, Q, R). The western branch had its southern side walled sometime before 1836, as this wall is shown on Sanderson's county map of this date. The final road to be noted is that to Congleton built from a junction with the Buxton to Leek Turnpike, under an Act (29 GIII c93) dated 1789 (Fig. 2, S). The unwallled north-eastern section of this was abandoned in 1821.

In the relatively sheltered dip, where the 1759 road follows the upper Goyt, four sets of buildings were erected by the roadside in the late 18th and early 19th centuries. These were demolished in the 1930s when the Fernilee Reservoir was built downstream. Their sites are still recognisable by the small stands of mature trees that surrounded them. The three westernmost sites also have surviving footings. None of these buildings appear to have been

built for direct use by the colliery. To the west was Marchington Farm (Fig. 2, T), once possibly the Coach and Horses Inn, with extensive fields behind to the north, presumably laid out after the colliery shafts here had been abandoned early in the 19th century. The next building was Moss House (Fig. 2, U), which was the only building present when Burdett published the first edition of his county map in 1767 (Harley *et al.* 1975). Next was Moss Hall (Fig. 2, V), built by 1818 (Staley 1818). Furthest east was Goyt's Moss Farm (Fig. 2, W), with outbuildings a little to the west, again present by 1818.

*Table 1: Different zones within Goyt's Moss Colliery, their characteristics and evidence for dating*

### Early Mines

Zone	Characteristics	Dating Evidence
A	— Opencast pits at the outcrop.	Approached by a hollow way not related to the 1759 turnpike road, therefore probably 17th or possibly early 18th century in date.
B	— 16 simple shafts, 3 with winding mounds. — 1 probably simple shaft or possibly 'cog and rung' shaft. — Simple causeway development.	Approached by a hollow way not related to the 1759 turnpike road, therefore probably first half of 18th century in date.
C	— 14 simple shafts. — 2 probably simple shafts or possibly 'cog and rung' shafts. — 1 possible run-in adit or opencast working. — 1 drainage sough. — No causeway development.	Approached by a hollow way not related to the 1759 turnpike road, therefore probably first half of 18th century in date. The sough could drain mines in zone C but it may well be later, driven to mines in zones G or L (see text).
D	— 10 simple shafts. — 1 probably simple shaft or possibly 'cog and rung' shaft. — Atypical narrow causeway development.	Approached by a hollow way probably not related to the 1759 turnpike road, therefore probably first half of the 18th century in date. The Dickinson's are known to have been mining coal on Castids Common from at least as early as the late 1730s to the end of the 1770s (Leach 1996). This may have been the site of some of their earliest operations.
E	— 4 simple shafts. — 1 probably simple shaft or possibly 'cog and rung' shaft. — No causeway development.	Analogy with zones B-D suggests a date in the early or mid-18th century. The Dickinson's ... etc. to end - as for D.
F	— 9 simple shafts. — 1 probably simple shaft or possibly 'cog and rung' shaft. — No causeway development.	Analogy with zones B-D suggests a date in the early or mid-18th century. Mining may have continued for a short period after the 1759 road was built.

Zone	Characteristics	Dating Evidence
<b>Intermediate Mines</b>		
G	<ul style="list-style-type: none"> <li>— 6 probably simple shafts or possibly 'cog and rung' shafts.</li> <li>— Developed causeways.</li> <li>— Causeway to sough tail and zone B.</li> </ul>	At the end of the 1773 turnpike branch that may have been blocked in 1780 (Roberts 1992, 62), or in 1804 (anon. 1804). A lease dated 1780 indicates that mining had moved south of the 1759 turnpike by this date (Roberts and Leach 1985, 22). The mines at G therefore probably date from 1773-1780. The sough in zone C may well have been driven to dewater the mines in G (see text).
H	<ul style="list-style-type: none"> <li>— 11 simple shafts.</li> <li>— 10 probably simple shafts or possibly 'cog and rung' shafts.</li> <li>— 12 shafts with whim gin hollows.</li> <li>— Developed causeways.</li> </ul>	All shafts are associated with causeways from the 1759 and 1773 turnpikes. There is a tendency for the simple shafts to be associated with the 1759 road, while the early whim gins, with two possible exceptions, are associated with the 1773 road. Therefore all shafts are probably c. 1760-1800, with a tendency for mining to move south through time.
I	<ul style="list-style-type: none"> <li>— 6 simple shafts.</li> <li>— 1 probably simple shaft or possibly 'cog and rung' shaft.</li> <li>— 2 shafts with possible whim gin hollows.</li> <li>— Developed causeways in part.</li> </ul>	Most of the shafts are associated with causeways branching from the 1778 turnpike extension and are probably the first shafts dug when this road was built. Two to four other shafts may be somewhat earlier. The Dickinson's are known to have been mining coal on Castids Common from at least as early as the late 1730s to the end of the 1770s (Leach 1996). Those at I may well have been some of their latest operations.

**Late Mines**

Zone	Characteristics	Dating Evidence
J	<ul style="list-style-type: none"> <li>— 20 shafts with whim gin mounds, 11 of which are high and mostly located to the north.</li> <li>— 4 shafts with large spoil heaps that may have had whim gins on their tops.</li> <li>— Developed causeways with dendritic pattern, analysis of which shows the trend of development is to move gradually northwards through time.</li> </ul>	All the shafts are associated with causeways branching from the 1778 turnpike extension. They probably date from c. 1780 to the early 19th century. Farey's 1811 account of the colliery notes that it was located east and north of 'Moss-houses' (Farey 1811, 198). Those to the east were those in zone K, while those to the north may well have been in zone J. Mining had certainly ceased by 1842, as there are no shafts shown on the Ordnance Survey map of this date (surveyed 1837-42).

Zone	Characteristics	Dating Evidence
K	<ul style="list-style-type: none"> <li>— 22 shafts with whim gin mounds, 8 of which are high and tend to be located to the east and north.</li> <li>— 2 shafts with large spoil heaps that may have had whim gins on their tops.</li> <li>— 1 possible simple shaft.</li> <li>— Developed causeways.</li> </ul>	<p>The majority of shafts have causeways which branch from the 1773 turnpike, but all may date from after 1780. This is the postulated date when the 1759 turnpike was walled (Roberts 1992, 62). A lease dated 1780 indicates that mining had moved south of the 1759 turnpike by this date (Roberts and Leach 1985, 22). Six of the shafts are shown on the 1818 colliery plan (Staley 1818), their location indicating that all the western and south-western shafts had already been closed. In contrast, the two most northerly shafts and the two most easterly shafts had still to be dug. Staley's plan accords with Farey's 1811 account...etc. to end - as for J.</p>
L	<ul style="list-style-type: none"> <li>— 7 shafts with whim gin mounds, all but one of which are high.</li> <li>— Developed causeways.</li> </ul>	<p>These shafts are not shown on the 1818 colliery plan (Staley 1818), while 5 are marked on the 1842 Ordnance Survey map. Thus they were possibly started in the 1820s or more probably the 1830s. Only the most northerly shaft and the most easterly shaft had not been dug by the survey date for the 1842 map (surveyed 1837-42). The most easterly shaft was probably the only one still in use in the late 1850s and appears to have been retained later as an air shaft (anon. 1902). The sough in zone C may have been driven to dewater the mines in L (see text)</p>
M	<ul style="list-style-type: none"> <li>— Documented pillar and stall workings reached by adit.</li> <li>— 1 shaft with irregular waste heaps.</li> <li>— 1 reused whim gin shaft with second irregular waste heap.</li> <li>— 1 lost shaft (and another beyond the illustrated area to the east).</li> </ul>	<p>Documented as working from the 1862 to 1880 (anon. 1902).</p>
N	<ul style="list-style-type: none"> <li>— 2 shafts with irregular waste heaps.</li> <li>— 1 lost shaft.</li> </ul>	<p>A late shaft mine started before 1858 and continuing into the early 1860s (anon. 1902).</p>
O	<ul style="list-style-type: none"> <li>— 1 shaft with irregular waste heap.</li> </ul>	<p>A late shaft mine worked in the late 1850s and early 1860s (anon. 1902).</p>
P	<ul style="list-style-type: none"> <li>— Documented pillar and stall workings reached by adit (with some previously used reached by 4 shafts).</li> <li>— 4 shafts with irregular waste heaps.</li> <li>— 2 lost shafts.</li> </ul>	<p>Documented as working from 1868 to 1893 (anon. 1902).</p>

### ANALYSIS OF COLLIERY DEVELOPMENT FROM THE 17TH TO MID-19TH CENTURIES

An analysis of the structural components within different parts of the colliery, taken together with dated roads and 19th century maps, allows the colliery to be divided into zones (Figs 2, 4; Table 1) and their development to be discussed.

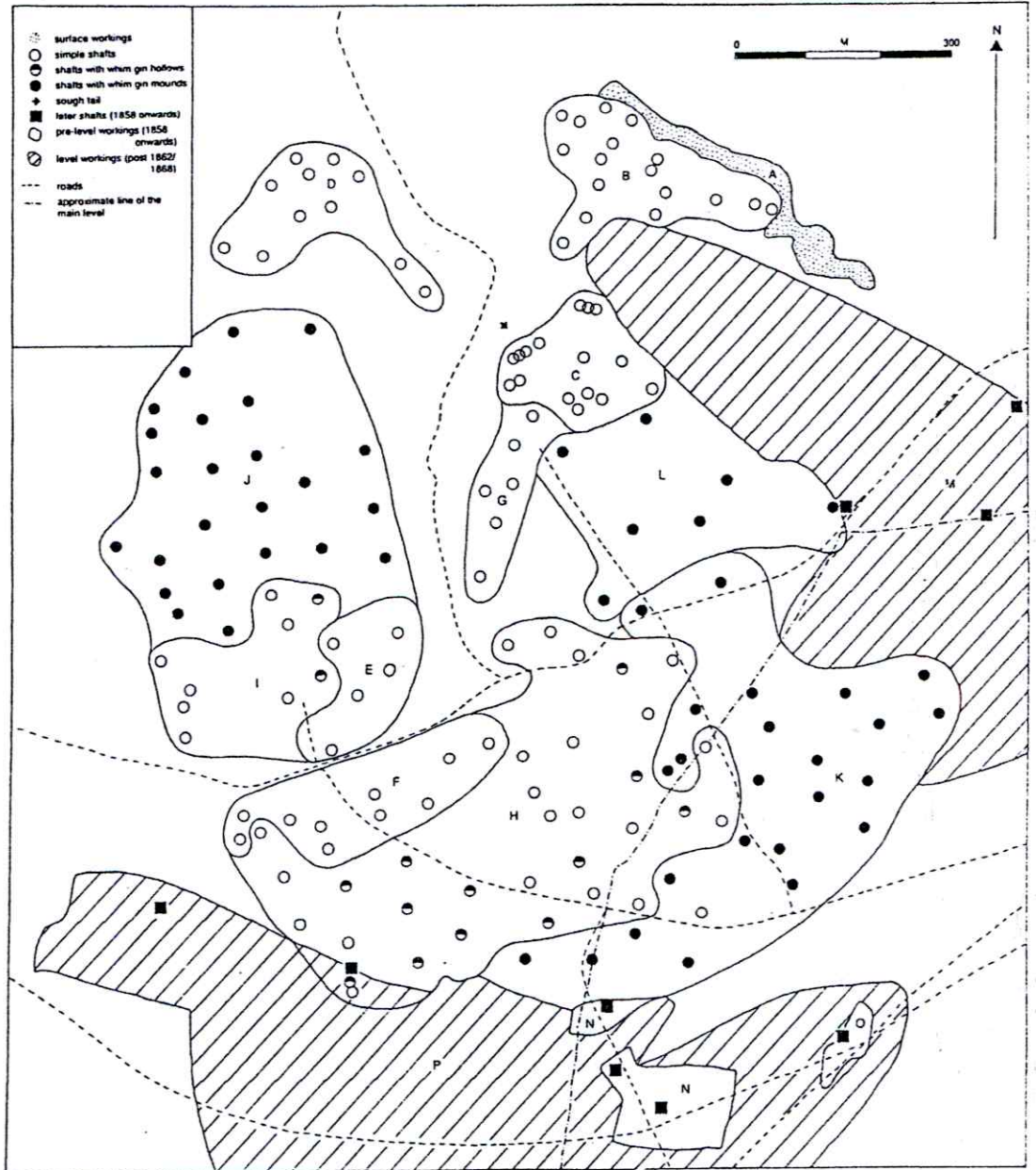


Fig. 4 The Goyt's Moss Colliery: development through time.

Synthesis of the detailed points listed in Table 1 above allows an overview of the spatial development of the colliery to be undertaken.

The early mines occur in three places. The presence of surface workings in zone A suggest that the coal was first discovered here. Expansion into adjacent zones B and C was a logical progression from this. The knowledge that coal existed in zones A and B would probably have prompted the exploration and discovery in zone D. However, this area was presumably exploited independently as the land was in different ownership. The third area of early mining comprises zones E and F, to either side of the upper stretch of the River Goyt. These may have been dug once coal in zones A-C was proven, leaving zone G unexploited as shafts here would have needed to be deeper. Alternatively, as coal is exposed by the stream at one point between zones E and F, it may have been found independently of workings in zones A-C.

While first exploitation may well have taken place in the 17th century, extraction is likely to have been small-scale and zones B-D were probably active throughout the first half of the 18th century. Zones E and F may well have been active before the building of the 1759 turnpike, but this general area of the colliery became the focus for mining once the road was built because of better communications. This is indicated by the causeways from the turnpike found in zone H and probably I. It may well be that mining at zones A-D had ceased by the 1750s, possibly because of the drainage problems documented in the 1730s (Short 1734).

Extraction was probably still relatively small-scale for a while after the building of the 1759 road, compared with later in the 18th century. Mining at this time was restricted to part of zone H and probably E, F and I. A further impetus to increased production was the building of the 1773 turnpike, leading eventually to a boom in 1790-1816. The disposition of the two branches of the 1773 road suggests that at that time mining was active both in the western parts of zone H and in zone I, and was also started in zone G. Exploitation in the last area was presumably undertaken because shallow coal reserves elsewhere were becoming exhausted. This last venture may have closed in or before 1780, with the postulated walling of the 1759 road in 1780 (Roberts 1992, 62). An extant lease of this date shows that the current mines then lay south of the road (Roberts and Leach 1985, 22). It may be that zone G was abandoned simply because of drainage problems. The walling may not have taken place until the early 19th century, as the walls are depicted on the 1804 Hartington Enclosure Award plan as newly-planned (anon. 1804).

The shallower reserves were becoming depleted in the 1770s and 1780s which led to the sinking of deeper shafts with gin engines. Raising a 'pit frame' in December 1772 cost 5s. 8d. (Chatsworth L/91/17). Although harder and more expensive to reach, there were large reserves at greater depth and output peaked in the decades to either side of the turn of the 19th century. The deeper mining may well have started in the 1780s, initially in the southern parts of zones H and J. From H mining gradually spread westwards into K, with the reserves at a reachable depth eventually running out to the west in the 1820s or 1830s. Thus, at this time, attention returned to the area north of the 1759 road in zone L, and mining was still active here in the late 1850s. The mining to the north-west, in zone J, probably continued into the 19th century. Farey's account of 1811 suggest mines were still active here. They are not shown on the 1818 colliery plan (Staley 1818), but it is unclear if this is because the land here did not belong to the Duke of Devonshire and thus was not included, or because the mining had already stopped. It had certainly ceased by 1842 (Ordnance Survey 1842).

A new venture in the 1850s and early 1860s was the sinking of shafts to the south into deeper reserves in zones N and O. These were the last shaft mines in the colliery. The development of

the colliery from the 1860s to 1890s, associated with the extension of the level from Burbage, will be discussed below. This level at an earlier date was a sough that drained the lower Ringinglow seam which was worked with the aid of haulage shafts, including the Bucket Engine, located on Burbage Edge a short distance east of Goyt's Moss.

### THE UNDERGROUND LEVELS

Associated with the mines on Goyt's Moss and Burbage Edge/Axe Edge there is one small sough of indeterminate date draining to the River Goyt and two major levels further east, used for drainage and haulage. Until recently it was believed that the oldest of the latter was a canal tunnel from Level Lane, Burbage, which ran west into the hillside where it struck the Ringinglow seam and then was thought to turn south and run to the county boundary, a distance of almost three miles; such a course is shown on the 1919 abandonment plan. Driven around the 1770s, it was called the 'Dukes Old Level'. The other level ran from a higher site just to the south of Macclesfield Old Road as it runs as a track over the moors. Called the 'Goyt', 'New' or 'Upper' tunnel, the abandonment plans of 1894 and 1919 show it running to the west and then south-west to service the Yard seam under Goyt's Moss. Farey appeared to refer to this level in 1811 as being nearly complete and to be worked by a tramway. Evidence on the ground outside the higher level shows that it was worked in this manner (Roberts and Leach 1985, 57-59).

However, the discovery at Chatsworth House of an uncalendared plan of the 'Thatch Marsh and Goyt Collieries' by B. Staley, surveyor, dated 1818, has thrown this hypothesis into confusion (Fig. 5). It depicts:

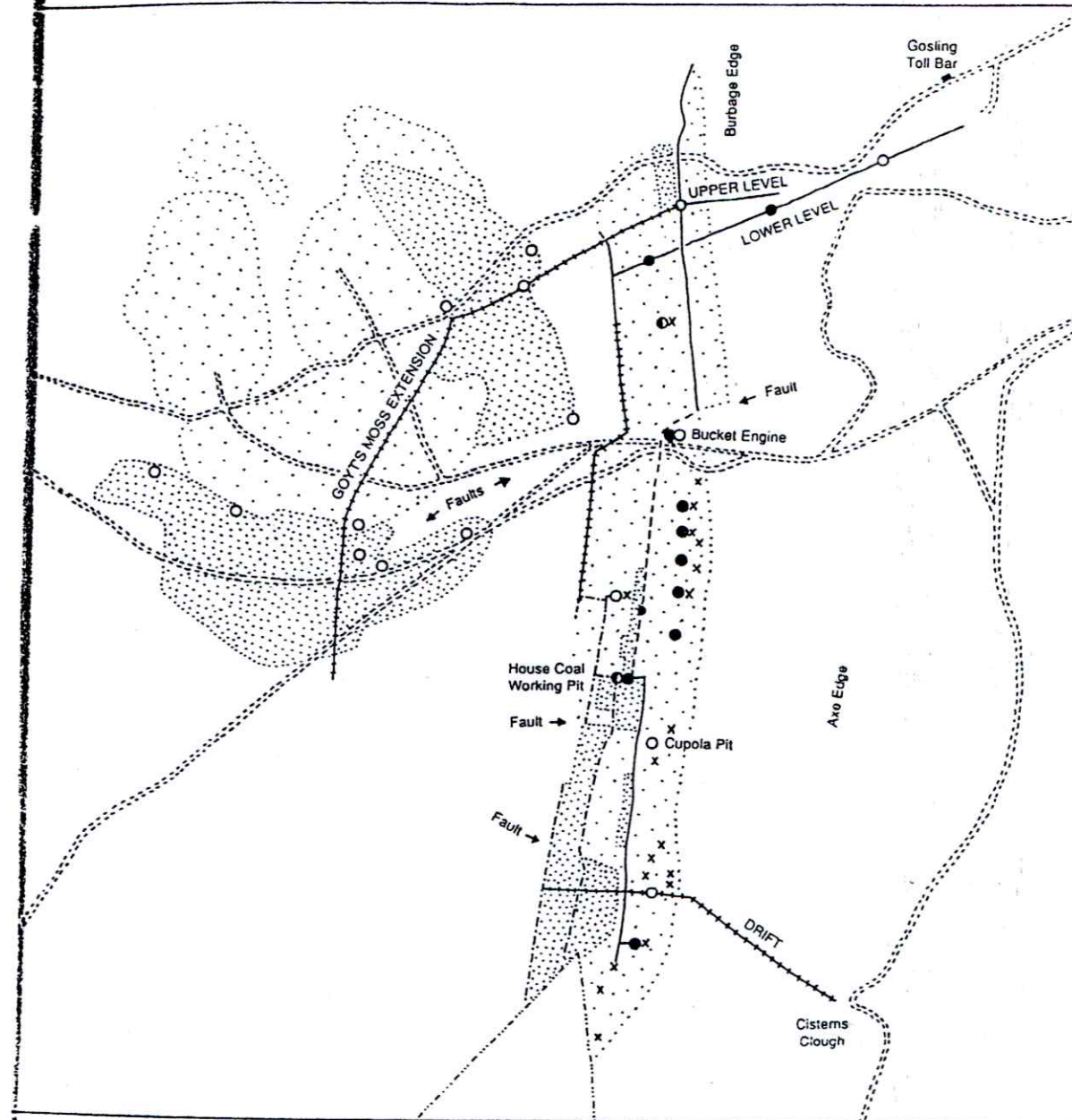
The upper level is marked as the 'Old Level' and not reaching Goyt's Moss. Instead it reached the Ringinglow seam and then exploited the seam in tunnels north and south, some 200-230 yards (180-210m) east of the line of the lower level, as shown on the abandonment plan, and at a higher elevation. The southern tunnel ran to the county boundary near Cheeks Hill and passed under the early Bucket Engine Pit (Roberts and Leach 1985, 40). A central length of this level is annotated as 'doubtful' from a point just north of the Bucket Engine (where the level reached the fault which displaced the workings westwards), and extending southwards from it in a straight line for about 750 yards. A series of shafts are marked east of this line, entering the seam up-dip. Beyond the 'doubtful' portion the level is again planned in more detail, as indicated by its slightly sinuous course. A shaft is shown where the level takes a short abrupt change in direction eastwards. At the southern end of the workings another shaft is depicted with an adjacent dotted circle which may well indicate there was a gin engine here.

The lower level, simply marked 'Tunnel', ran west into the Ringinglow seam where there were modest workings shown termed 'Thatch Marsh Colliery'. These included driveways and a single shaft, again depicted with what may well have been a gin circle. The plan does not show the level running south for any appreciable distance, in contrast to what is shown on the 1919 abandonment plan.

Goyt's Moss Colliery was worked by shafts rather than a level. One is again depicted with what may well have been a gin circle.

The purpose of the survey is not known and therefore it should be treated with caution. While what it depicts appears to be reliable it is unclear what was omitted as irrelevant to its purpose. Although limited workings are shown above the end of the lower level, none are shown in association with the upper level nor with the shafts on Goyt's Moss. In the latter case and

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|-----------|---|---|---|
| —         | levels shown on the 1818 plan                   | ● | shafts shown on the 1818 plan                               |
| - - -     | levels shown on the 1818 plan marked 'doubtful' | × | shafts shown on the 1842 map                                |
| - - - -   | levels shown on the 1902 plan                   | ○ | shafts shown on the 1902 plan                               |
| - - - - - | main driveways shown on the 1902 plan           | ⊙ | engine shafts shown on the 1902 plan with surface buildings |
| - - - - - | turnpike roads                                  | ⋯ | coal extracted before 1858                                  |
| - - - - - | county boundary                                 | ⋯ | coal extracted after 1858                                   |



Fig. 5 The Goyt's Moss Colliery: underground levels from Burbage to the Goyt's Moss and Axe Edge mines.

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probably at the southern part of the upper level, given the depiction of what may well be a gin engine, coal was almost certainly being extracted at this date. Given this imbalance in depiction of workings, this may suggest that the primary purpose of the plan was to show the lower level and its relation to other main levels at the colliery (see below). The meaning of the term 'doubtful', as applied to the central section of the upper level, is obscure. It may be just that it was not planned in detail here and therefore its exact line was doubtful. At the other extreme it may indicate that this part of the level was no longer accessible in 1818 (although it could still have been draining water) and therefore its line could not be planned.

Documentary evidence for the levels is fragmentary and is as follows:

Chatsworth 'L' series papers and other papers:

Reference in 1751 to 'a water Caled Wash Brook on the East side of the New Sough', in a survey of the bounds of Hartington Common (L/94/13/TV/B/No 2).

Reference in correspondence dated 9/12/1776 that Mr Brock is '...laying out a good deal of money to improve the Colliery by carrying up two soughs one of which is to carry boats to the works' (L/94/13/EX/No 2).

Thomas Wild's colliery accounts for 1790, with several references to driving and repairing the 'navigation' and cleaning the sough (L/110/47).

Expenses for driving the level, half year to 13/6/1792 — £171 16s 9d (L/91/17).

Reference in correspondence dated 3/5/1813 that the level was expected to be brought shortly into operation (uncalendarised; from P. Heacock to J. Heaton).

Chatsworth 'T' series accounts:

Driving the level 1803-1813	£7484 9s 2d
Driving the level 1825	£514 19s 10d

Hartington Enclosure Award map, dated 1804.

This does not show either level as they were irrelevant to its purpose, but it does include buildings adjacent to Level Lane in the vicinity of the lower level.

John Facey (1801):

In a list of collieries (page 212) — 'Thatch-marsh.....(Works 2.25 miles long). 1st Coal' [Facey's nomenclature for the Ringinglow seam] '....will soon be worked by a railway Tunnel'.

In a list of soughs or levels (pages 330-332) — 'Thatch Marsh, W of Buxton, from near Gosling Tail Bar 0.5 miles long ..... for trams to bring out the coal now driving'.

The 1808 Staley survey — see above.

Ordnance Survey first edition one inch to a mile map, sheet 81SW, published 1842.

This shows the entrance to the lower level, marked as 'Coal Pit', but not the upper level.

Stephen Eddy (1852):

'The "Goit" Colliery...has been worked away through a large portion of the ground. The present workings are approached by a shaft, about 34 yards deep. These workings appear to be near the centre of the Basin...as the bed here lies nearly horizontal...'

'The [bed of the] "Thatch" or "Rawmarsh" Colliery is about 110 yards below that of the "Goit" Colliery. It is approached by a Horse Level which extends about 1,200 yards in a westerly direction before it intersects the bed of Coal, on which there are old levels extending North and South some considerable distance, the one northwards from the Horse Level has long been allowed to go out of repair, and is now closed'.

Ordnance Survey first edition twenty-five inch to a mile map, Derbyshire sheet XXI.4, published 1880.

This shows the entrance to the lower level, with a small rectangular dock-like feature containing water immediately outside the entrance. No rails or other features are shown, indicating the level was disused other than possibly for drainage. The entrance to the upper level is shown with rail lines leading to coke ovens and chutes above a siding of the Cromford and High Peak Railway.

Abandonment plans for 1894 and 1919, together with a plan of similar date (anon. 1902).

Roberts and Leach (1985, 40-45): Analysis of the expenses for driving and maintaining the level in 1790.

From the above a new appraisal of these underground levels can be made, but it should be emphasised that it is based on the limitations of available knowledge and therefore there are significant uncertainties over the location of some of the documented features.

It is now considered likely that the 'new sough' of 1751 is the upper level (Fig. 5), previously stated to be of later date and operated by a tramway. This postulation accords with the geography expressed in the 1751 document and also with the fact that this level is marked 'Old Tunnel' on the 1818 Staley survey. Also, it seems logical that this upper tunnel should lie at a higher level to that driven later to dewater the seam at greater depth. From the 1751 sough major levels were driven north and south in the seam to drain and extract coal on the up-side via a number of shafts, including the 'Bucket Engine'. Two further shafts associated with the sough, known as the Rise Pits, were active in the 1790s and were suggested previously to be located north of the Bucket Engine (Roberts and Leach 1985, 46). In the light of the new research presented here this is now a matter for debate which is beyond the scope of the present paper and awaits a detailed re-appraisal of the Thatch Marsh Colliery as a whole.

When the lower level was later created and extended southwards the upper level would presumably have ceased to function as a sough but may well have continued to be used for haulage. Two long stretches of the upper level were shown in 1818 but these had been abandoned by 1858 when extraction records were started; they were not shown on the abandonment plan.

Also it is believed that one of the two soughs being driven in 1776 may be the one which drains Ravenslow Flat on Goyt's Moss into the River Goyt. The other sough ('...which is to carry boats to the works') is more difficult to place. From the available evidence there are two

likely alternative sites, both running west under Burbage Edge to intersect and drain the Ringinglow seam (Fig. 5). The first of these, as Roberts and Leach suggested (1985), is the lower level, whose entrance was at Level Lane, Burbage. Outside the entrance was what appears to be the remains of a small rectangular dock containing water, marked on the first edition 1880 Ordnance Survey 25 inch to a mile map. The alternative location is the upper sough level driven in the 1750s. If so, then the 1770s account refers to conversion of the sough to a 'navigation' at this time. Both the upper and lower levels, once they reached the seam, had tunnels running north and south along the seam thus enabling the dewatered coal to be extracted updip. These tunnels would have been driven gradually over time and would have formed part of the colliery deadwork. As such their driving costs would have been regular items in colliery accounts, and appear in 1790 and 1792, years for which more detailed accounts are available. Accounts for the area of the colliery around the Bucket Engine make frequent references to the 'navigation'. Staley's plan of 1818 appears to show that the lower level had only been driven a short distance southwards by this date.

Taking these strands of evidence together, both postulated locations have evidence for and against them. If the 1770s canal was located in the lower level then this explains the presence of the dock-like feature shown on the 1880 map. However, the main problem with this hypothesis is the shortness of the north/south tunnels, as shown on Staley's plan. Given that 40 or more years had elapsed from when the canal level was begun, it is probable that the southern tunnel at least would have been significantly longer than depicted, assuming there was not an extended period over which it was little used or abandoned; there is no evidence to suggest that this was the case. It may be simply that Staley was not commissioned to show the full extent of workings, as his lack of detail around shafts, thought to have been active at the time, demonstrates. Thus any continuation of the level southwards may not have been shown, particularly if it was not in use at this date. However, that Staley's plan shows part of the upper level as 'doubtful' can be taken to mean that he was at least showing major levels that were inaccessible. If this is the case, and if the lower level had extended further south, this begs the question why didn't he also show this. The alternative explanation of Staley's plan is that the southern tunnel is shown to its full 1818 extent and this in turn casts doubt on the canal ever having been sited here.

The alternative location for the canal documented in the 1770s and 1790s is the upper level, driven as a sough in the 1750s. This interpretation has the advantage of simply explaining the small extent of workings associated with the lower level, as documented in 1818. A further argument for locating the 1770s canal in the upper sough relates to the £7484 cost of creating a rail haulage level between 1803 and 1813. This high cost is difficult to understand purely in terms of reinstating an old level and laying rails. It is better explained as being the result of driving a major new level; this may well be the lower level shown on Staley's 1818 plan. That a new level had recently been finished may explain why Staley was commissioned to carry out a survey. This possibility is consistent with what he depicts, showing the new level with a small area of driveways and a shaft immediately updip which could have been coming into production at this time. The plan compares this new part of the mine with the line of the old level and thus indicates the potential extent for further working if the north/south tunnels were to be extended. That coal reserves immediately south of the workings associated with the lower level, shown by Staley, had not been worked previously (from a postulated canal in the lower level) is supported by the presence here of a new shaft with steam-powered engine sunk sometime in the period 1818-30s. Against the postulated location of the canal in the upper

sough is the presence of the dock-like feature at the entrance to the lower level. If the upper level was indeed the site of the canal then it could be alternatively explained as a small dam created after the lower level ceased to be used for rail haulage (see below). However, the purpose of any such dam is unclear and there is no documentation of any 19th-century activity in the vicinity that would have required such a structure.

The 1770s use of a level as a canal is paralleled by similar contemporary developments in the area, as at the Ecton copper mines near Warslow (1767) and the Speedwell lead mine at Castleton (1774).

There is also uncertainty over the location of the rail haulage level created at the beginning of the 19th century. Hitherto, in 'The Coal Mines of Buxton', it was believed that this level was driven around 1811 directly into the Yard seam under Goyt's Moss. Staley's plan clearly refutes this. Farey records that this rail level was to bring coal out of the '1st' or Ringinglow seam so this much is certain, but again both the upper and lower levels from Burbage need to be considered (Fig. 5).

Taking the lower level first, as noted above, this had either been used previously as a canal tunnel or was a new level started at the beginning of the 19th century. Farey's reference to the rail haulage level being near Gosling Toll Bar suggests it was located at the lower level, as the toll gate was much nearer this level (Fig. 5). Assuming that the lower level had been a canal tunnel, it would appear to have lost its haulage function by 1852, as Stephen Eddy does not refer to the canal. This loss was perhaps part of the general run down by Boothman which prompted Eddy's survey (see below). However, it is more probable that the lower level was in use by horse-drawn rail haulage in the early 19th century. That Farey also did not mention a canal suggests it was disused by the time he was writing. Thus, even if this level had once been the site of the canal, this creates no problem with also interpreting it as the site of the early 19th-century rail-haulage level. However, in the discussion above on the location of the 1770s canal, it was argued that the substantial cost incurred between 1803 and 1813 in creating the rail haulage level is a strong reason to believe that the lower level was driven in the early 19th century, rather than that it was an older level reused.

The alternative location for the rail haulage level is the upper level, first driven as a sough in the 1750s. In favour of this interpretation are the remains of the tramway surviving at the entrance which comprise a central paved walkway with wear on one side created by tub wheels. This is consistent with the type of plateway with internal flanges current in the late 18th and early 19th centuries. However, the possibility should also be considered that an old plateway taken from elsewhere (possibly the lower level) was reused here in the mid-19th century (see below). More significantly, the upper level is not marked on the 1842 Ordnance Survey map whereas the lower level is. Similarly, the 1804 Enclosure Award plan for Hartington shows buildings in the vicinity of the lower level but not at the upper level. These plans suggest activity concentrated at the lower level through the first half of the 19th century. Finally, it is hard to account for the great cost of the level documented between 1803 and 1813 (£7484) purely in terms of reinstating a pre-existing tunnel and laying rails.

On balance it would seem that the references to driving a level in the early 19th century and to it being worked by rail, took place at the lower tunnel. However, until further evidence comes to light both hypotheses must remain open. This level, irrespective of whether it had previously been used as a canal or not, inevitably would have acted as a drainage sough through the 19th century as its north/south tunnels followed the sole of the mine. The use of soughs for both drainage and rail haulage is known elsewhere in the Peak District at several

lead mines, for example at Stoke Sough near Eyam driven intermittently from 1720 to 1804, where the sough had a false floor with rails above the water course (Jim Rieuwerts 1987, 24; *pers. comm.*). Similarly Ridgeway Sough at Crich, which was driven between 1803 and 1815, is now known to have been used for rail haulage rather than for boats as once thought (Jim Rieuwerts 1987, 126; *pers. comm.*).

By the time coal extraction records were kept from 1858 onwards, the lower level had been driven (at whatever date) and was accessible to a point just north of the House Coal Working Pit on Thatch Marsh. It was linked with workings further south via a driveway which followed the seam upwards to a shaft present by the late 1830s and which today has an adjacent gin mound. The extent to which the lower level had previously been driven southwards beyond this point is unknown as it had been abandoned prior to 1858. It may never have extended much further as the seam is faulted a short distance to the south and deep workings beyond here are all of late 19th century date (but also see below). Although the southern branch of the level is shown on the abandonment plan no coal was extracted from adjacent to it after 1858. It is unclear if it was thus abandoned shortly after this date; Eddy notes the northern branch had been abandoned prior to 1852. Alternatively the southern branch may have been kept open to function as a sough for the remaining years of colliery extraction. In either event, the dock-like feature at the level entrance still retained water in the late 1870s. Up until the 1950s the level's entrance had doors and issued water. With redevelopment at that time the dock area was levelled but today water still has to be piped away from the entrance.

What is clear is the re-use of the upper level (the 1751 sough) as a starting point for the new tunnel to Goyt's Moss driven in the mid-19th century (Fig. 5). Exactly when it was started is unknown. As noted above, the entrance to the 'old' level is not shown on the first edition Ordnance Survey map indicating this level was disused at this date, hence re-instatement must have occurred subsequent to the late 1830s. Coal was being regularly extracted adjacent to it at Goyt's Moss from 1862. A small amount shown on the abandonment plan to have been extracted in 1859 may well have been by shaft. Coal was regularly extracted from adjacent to the level in the southern parts of the reserves under Goyt's Moss from 1868 indicating it had been extended to here by this date. The level took coal from Goyt's Moss on a horse-drawn tramway, as indicated by the surviving plateway outside the entrance. In his survey of the colliery in 1852 Eddy refers to the Yard or 'Goyt' coal being extracted by one shaft, and makes no reference to extraction via a haulage tunnel. It seems probable, therefore, that this major level was driven by the Buxton Lime Company (lessees from 1859) as part of a major re-investment in the colliery. This concurs with the sinking of the House Coal Working Pit of 112 yards (102m) depth and the erection of a steam engine on Axe Edge which extracted Ringinglow coal. The level fell out of use in the 1890s when the Goyt's Moss mine closed.

In the second half of the 19th century, coal production from the Ringinglow seam below Axe Edge was relatively small compared with Goyt's Moss because problems caused by the steeply dipping seam here resulted in new drainage measures only freeing limited areas of coal. To facilitate mining at the southern end of the colliery a drift entrance for rail haulage was driven in the 1870s from Cisterns Clough (Fig. 5) and continued in use until the colliery was abandoned early in the 20th century (Roberts and Leach 1985, 62). Coal was first extracted at depth here in 1878. How this area was drained is unclear, one possibility is that the lower level from Burbage had been driven sufficiently far south in the first half of the 19th century to dewater this part of the colliery.

## DISCUSSION

The earliest specific reference to mining on Goyt's Moss, then termed Ravenslow, occurs in 1751 in an account of the 'Buts and Bounds' of Hartington Common (Chatsworth L/94/13/IV/B/No 2). The relation of shafts to turnpike roads, as discussed above, suggests however that mining had started well before this date. The Earls of Devonshire acquired a mine (probably on Axe Edge) when they purchased the manor of Hartington in 1662 (Chatsworth L/94/13/IV/B/No 9). By 1698 mining had been let to the Brock family, together with the Grin lime kilns (Leach 1996, 103-109), in whose hands they remained until 1789. In 1766 a valuation of the coal mines and limekilns was undertaken:

'One other Colemine caled Guite on Guite Moss to work 15 men in the Ground and no more for 7 months in the year at £3 per man — £45' (Chatsworth L/94/13/V).

The seasonal nature of the working probably reflects the very wet underground conditions.

In 1770 the Castids Colliery, immediately west of the River Goyt, produced 35,165 loads of Yard coal (approximately 1750 tons), yielding a profit of £117 13s 7d (Chatsworth L/94/13/IV/B/No 4). In comparison, James Brock claimed that in the same year his operation at the Ducal collieries had lost him £10 3s 10d. Income of £396 12s 6.5d was set against rent of £200 and disbursements of £206 16s 4.5d. The latter may have been disproportionately high as this period may have coincided with the beginning of driving major underground levels, known to have been in progress in 1776. In the previous year the colliery had made a profit of £113 1s 3.5d. Mrs Brock retired in 1789, causing the Duke to keep the mines in hand under managers Thomas Wild and George Dickens.

In 1790, the first year of Ducal management of Goyt's Moss, there were eight shafts used over the year, two to four at any one time. Four of these were new shafts sunk in 1790 (Roberts and Leach 1985, 34-35, 39). On this basis the 155-64 identified shafts represents about 40 years of production. This does not tally with the known chronology. Thus, for much of the 120-50 years over which we know shafts were being sunk, there were probably only one or two shafts dug per year.

From an average spacing of 18th and early 19th-century shafts it has been calculated that an average of 2000 tons of coal was taken out of each shaft (Roberts and Leach 1985, 65). However, the earliest shafts close to the river are significantly closer together and therefore production would have been less. In contrast, the early 19th-century shafts to the east, immediately north of the 1759 turnpike road, are spaced further apart and may have had significantly higher yields.

The period 1790 to 1816 was the one of greatest production. Table 2 lists the production at Goyt's Moss, the overall production and the estate profits for the period 1790-1817, taken from the surviving accounts (Chatsworth T series). Quantities are given in scores and corves which approximate to tons and hundredweights (Roberts and Leach 1985, 32-33). Goyt's Moss coal sold for 2s a score in 1790.

Production levels and profits maintained these levels until 1816 when a gradual but not uninterrupted fall commenced, reaching a low point in 1822 when a profit of only £353 2s 3d was made. Thereafter the mines were let for a rent of £800 per annum.

The surviving detailed accounts for 1790 also demonstrate that only 23 people were employed on a permanent basis at the Goyt's Moss shafts, about half of them underground. Several others were employed on a casual basis for specific tasks such as stone getting (Roberts

Table 2 Colliery sales and profits 1790-1817.

	Goyt's Moss		Total Ducal Sales*		Estate Profits*		
	scores	corves	scores	corves	£	s	d
1790	11653	4	16572	16	-	-	-
1791	8532	11	13219	10	-	-	-
1792	-	-	-	-	-	-	-
1793	9638	4	13665	8	-	-	-
1794	8551	9	11774	18	-	-	-
1795	8504	3	11853	3	-	-	-
1796	9544	8	12550	2	-	-	-
1797	9583	16	12833	8	-	-	-
1798	8138	6	11417	6	602	13	2.0
1799	5954	1	8981	4	411	10	7.5
1800	6492	12	9770	8	292	2	7.5
1801	7720	4	10960	5	511	0	4.5
1802	6985	7	10407	13	373	16	0.0
1803	7935	18	11693	5	842	6	2.5
1804	7231	12	10933	5	938	14	5.5
1805	7968	8	11713	17	849	1	7.5
1806	7713	6	10971	12	1111	3	5.5
1807	6716	19	10286	5	848	10	2.5
1808	7371	10	10507	4	671	10	1.5
1809	7950	7	11411	18	1200	7	5.5
1810	7358	0	10885	15	980	17	5.0
1811	7894	2	11149	3	980	17	5.0
1812	7885	12	11467	12	971	17	11.0
1813	7847	11	11799	30	1142	13	2.0
1814	8198	4	12950	0	1099	6	3.0
1815	8128	16	12960	16	1152	16	5.0
1816	6536	9	11003	19	1160	4	0.0
1817	5947	13	9953	2	832	18	11.0

\* Not including Black Clough Colliery which kept separate accounts.

and Leach 1985, 53).

From 1826 the tenant was Thomas Boothman, a Manchester lime and coal dealer with other mining interests at Standish, near Wigan, and at Whaley Bridge only c. 6 miles north of Goyt's Moss. Together with his son, John William Boothman, they worked the Dukes mines and the Grin limekilns (from 1827) until the latter's retirement in 1857 (Leach 1996, 113-15). Little is known about their activities but it does seem clear from a survey of the mines and kilns in 1852 that neither were working to full capacity (Leach 1996, 115). According to the surveyor, Stephen Eddy, he believed that the Boothmans were only maintaining the Buxton mines and kilns to avoid competition for their Whaley Bridge mines and Buxworth kilns.

In July 1859 the Goyt's Moss and Thatch Marsh Collieries were leased to the Buxton Lime Company for £100 and £200 per annum respectively, plus a royalty of £45 per statute acre of coal extracted (Chatsworth L/111/27/1). This company revitalised the mines and Grin

limekilns by investing a considerable amount of money. The major colliery improvements included the sinking of a new shaft with associated steam engine on Thatch Marsh and the extension of the 'Upper' or 'Old Level' from the Ringinglow seam, as referred to above. The company also began to import Whaley Bridge coal along the Cromford and High Peak Railway to mix with the poor grade Goyt's Moss coal at the Grin limekilns. Increased production on Goyt's Moss is reflected in the renewal of the lease in July 1884 when both collieries were let for £150 each (Chatsworth L/111/27/2). Production figures from 1859 to the collieries closure have been published in full (Roberts and Leach 1985, 89). An estimated total tonnage of 653,800 was produced with a maximum annual total of 29,100 tons in 1871. Goyt's Moss Colliery formally closed on 31 December 1893 due to the 'Area above water level worked out' (Mine abandonment certificate B16079).

### CONCLUSIONS

Goyt's Moss Colliery and its associated transport links are nationally important because of the extant archaeology supported by good documentation. Evidence for about two hundred years of active exploitation by a variety of techniques remains undisturbed. Whilst this article focuses upon the archaeology, sufficient historical information has been provided to give it a historical context and to understand and appreciate the nature and scale of the workings. Much more information is available and some of this has already been published (Roberts and Leach 1985, Leach 1986, 1987).

Goyt's Moss Colliery was less important as a coal producing unit in terms of its output. While a casual inspection of Figure 2 leads to the impression that the colliery was a large well-planned mine, in some senses this is illusory. While by Peak District standards it was relatively large, the features accumulated over an extended period. In the 18th century and the first half of the 19th century, the date to which most of the surface features belong, activity was restricted at any one time to one or two small parts of the site and only a handful of features at most were in use.

Comparisons of coal output from different mines are difficult due to the paucity of information available within the Cheshire coalfield and the fact that where data are available they often relate to different seams. In 1795 the Buxton collieries (Axe Edge, Black Clough and Goyt's Moss) produced 14,672 scores or tons (Chatsworth 'T' series accounts), the New Mills collieries owned by Rev'd Simon Jacson produced approximately 3,700 tons (PRO/DC/41/62), while the Poynton and Worth collieries owned by Lord Vernon produced approximately 27,000 tons (Shercliff *et al.* 1985, 16). After 1862, with the new investment in the underground level, production increased from Goyt's Moss in absolute terms. In 1795 production was 8504 tons, whereas in 1871 it produced 29,100 tons (Roberts and Leach 1985, 89). Ironically, with the rapid exploitation of the British coalfields its relative position declined. In 1887 the Goyt's Moss Colliery produced 20,700 tons of poor quality coal out of a total of 23,900 tons for the Buxton group, compared with 263,940 tons for the Poynton and Worth pits (Shercliff *et al.* 1985, 57) and 162.1 million tons for the United Kingdom total (Mitchell and Deane 1962).

The true historical importance of the Goyt's Moss Colliery lay not in its production but in its proximity to pure Carboniferous Limestone reserves and the part it played in the important regional expansion of the Derbyshire lime industry (Leach 1996, in press b).



## ACKNOWLEDGEMENTS

Many thanks to Derek Brumhead, Geoff Howe and Jim Rieuwerts who provided information and comment. The Trustees of the Chatsworth Settlement provided access to 19th-century estate maps and records. The Mine Record Office, Bretby, provided access to abandonment plans. The Upper Goyt Valley Liaison Group funded the archaeological survey of the colliery.

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*The Society gratefully acknowledges the financial support of the Peak Park Joint Planning Board in the publication of this paper.*